

REMARKS

Upon entry of the foregoing amendment, claims 1-3 and 5-42 are pending. Amendments to the claims are based on Claims 1-40 filed December 19, 2005. Claims 1-3, 5-14, 16-22 and 25-40 have been amended without prejudice to clarify the claimed subject matter. Claim 4 has been canceled without prejudice to, or disclaimer of, the underlying subject matter. Claims 41 and 42 have been newly added. Support for the foregoing amendment can be found throughout the specification and claims as originally filed, for example, *see* page 2, lines 13-22; page 5, line 7-11; page 19, lines 20-25. No new matter enters by way of the foregoing amendment.

I. Information Disclosure Statement

Applicants thank the Examiner for consideration of all references cited on the PTO-1449 forms submitted by Applicants on June 22, 2006.

II. Priority under 35 U.S.C. § 119

Applicants thank the Examiner for the acknowledgement of foreign priority.

III. Claim Rejections – 35 U.S.C. § 103

Claims 1-40 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Bryan *et al.* (Bryan & Bryan Inc., “Iowa Ethanol Plant Pre-Feasibility Study” (2000); “Bryan”) in view of Marnichenko *et al.* (Marnichenko and Kislava, “Intensified Saccharification and Fermentation of Starchy Raw Material Subjected to Prior Mechanical/chemical Destruction” Fermentnaya i Spirotovaya Promyshlennost (1978); “Marnichenko”)¹, Francesco *et al.* (Zinnamosca *et. al.*, US Patent No. 5,559,031; “Francesco”), Edmond² *et al.* (Filho *et al.*,

¹ Marnichenko is not discussed in the Office Action.

² The Examiner has used the first name of the author, Edmond A. Bargaue Filho, in the Office action, Applicants have maintained this usage throughout the response for consistency.

“Babassu Coconut Starch Liquification: An Industrial Scale Approach to Improve Conversion Yield”, *Bioresource Technology* 75:49-55 (2000); “Edmond”), Wayman *et al.* (Saccharification and Fermentation of Whole Barley Ground in the Szego Mill” *Starch* 40:418-422 (1988); “Wayman”), Weiland *et al.* (“Operational Behaviour of an Industrial Fixed Bed Reactor for Biomethanation of Alcohol Slops from Different Crops” *Wat. Sci. Tech.* 22(1/2):385-394 (1990); “Weiland”), or Fukuzaki *et al.* (“High Rate Performance and Characterization of Granular Methanogenic Sludges in Upflow Anaerobic Sludge Blanket Reactors Fed with Various Defined Substrates” *Journal of Fermentation and Bioengineering*, 79(4):354-350 (1995); “Fukuzaki”). Office Action at page 2. In rejecting the claims, the Examiner alleges that “the subject matter of claims 1-40 corresponds merely to the application to the different subprocesses of a bioethanol plant” and that “[t]here is no surprising, unexpected or beneficial effect.” *Id.* at page 3. Applicants respectfully traverse this rejection and request withdrawal for at least the following reasons.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Moreover, “[r]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with **some rational underpinning** to support the legal conclusion of obviousness.” *KSR Int’l. Co. v. Teleflex, Inc.*, 127 S.Ct. 1727,1741 (2007) quoting *In re Kahn* 441 F.3d 977, 988 (Fed. Cir. 2006) (emphasis added).

The Examiner has failed to establish a *prima facie* case of obviousness because the Examiner has not found prior art references, even if all seven are combined, that teach or suggest all the claim limitations. The Examiner alleges that "Bryan *et al.* discloses a process for the production of ethanol from corn where a roller mill is used for the grinding of corn (see page 38) and where the thin stillage (i.e. the supernatant after centrifugation of the stillage) is used as feedstock for the production of methane in an anaerobic digester (see page 43)." Office Action at page 2. The disclosure of Bryan is directed to a different approach which uses an evaporator that boils off the water from the stillage to provide a feedstock for the anaerobic digester. Bryan at page 43. Whatever else that Bryan discloses or teaches, it does not disclose or teach that the clear phase of the pulp can be used for the production of methane in an anaerobic digester.

In addition, the Examiner has not shown where in Bryan, or indeed any of the cited references, is a method for obtaining methane from "a clear phase with a content of solids of less than 1%" even disclosed. The Examiner alleges that the solids in Bryan "are almost completely absent from the thin stillage (i.e. well below 1%)." Office Action at page 2. This conclusion is erroneous as Bryan describes the thin stillage as "water that is separated off in the centrifuging process ... [i]t contains two to five percent dry matter as "fines" that escape screening or centrifuging." Bryan at page 29, paragraph 6. Moreover, Bryan is simply a "pre-feasibility study" about the possibilities of developing ethanol production in Iowa and does not direct the adoption of any specific parameters but rather lists broad ranges of hypothetical approaches. Bryan at page 20, paragraph 2.

The Examiner acknowledges that Bryan "fails to disclose details concerning the particle size after milling." Office Action at page 2. However, the Examiner apparently relies on

Francesco, Edmond, or Wayman to “invariably direct the skilled person and also disclose to [sic] the use of Small (1mm) particle sizes.” Office Action at page 3. None of the references disclose or suggest “obtaining a mash by enzymatically liquifying and saccharyfying the flour of a grain having a particle size of less than 1 mm.” At best, these references may discuss the use of small particle sizes for *fermentation* purposes. See Francesco at abstract and column 2, line 8-12, column 10, paragraph 3; Edmond at page 49 last paragraph to page 50, lines 1-2; Wayman at page 422, final paragraph.

Moreover, neither Bryan, nor indeed any of the other references, suggest the savings in energy and time in processing the pulp after distillation that result from obtaining a mash with a particle size of less than 1 mm. See Specification at page 7, paragraph 2. In fact, Wayman stated that while successive grinding “reduce[d] the ‘oversize’ retained on the 70 mesh screen” (section 4.1) it resulted in either decreasing the yield of ethanol following dual enzyme liquification and saccharification (see Table 1, column 5) or having no effect on ethanol yield when liquification and saccharification were simultaneous (see Table 2). Wayman, rather than suggesting particles of less than 1 mm, suggests that particle size has little or no effect on fermentation and is silent as to the effect of particle size on the anaerobic purification of wastewater as disclosed in the claimed invention.

It is well established that a selective approach to reading a prior art reference is improper. Each reference must be viewed “as a whole” to determine what it does and does not teach. “References are evaluated by ascertaining the facts fairly disclosed therein as a whole.” *In re Shuman*, 361 F.2d 1008, 1012 (C.C.P.A. 1966). As discussed, none of Bryan, Francesco,

Edmond, or Wayman discloses or suggests the use of a particle size less than 1 mm for obtaining a mash.

The Examiner states that Bryan fails to disclose “details concerning the methane reactor” and that Weiland and Fukuzaki make up for this deficiency. Office Action at pages 2-3. The Examiner apparently relies on Weiland and Fukuzaki to provide disclosure of high-performance methane reactors used in treatment of alcohol slops (stillage). *See id.* at page 3. Applicants respectfully disagree. While Weiland discusses the use of a fixed bed reactor for production of methane and the anaerobic treatment of waste water from bioethanol production, the instant specification states that “fixed bed reactors are not suitable for large-scale use in production of bioethanol due to the necessary long retention times.” *See* Specification at page 15, paragraph 1. As such, whatever Weiland discloses, Weiland does not disclose a high-performance methane reactor.

The Examiner alleges that Fukuzaki teaches the use of high performance reactors “in the treatment of alcohol slops (stillage)”. Office Action at page 3. Applicant again respectfully disagrees. Fukuzaki does not teach or suggest obtaining methane from the clear phase in a high-performance methane reactor. At best, Fukuzaki may imply use of an anaerobic methane reactor used for the treatment of “synthetic wastewaters containing starch, sucrose, ethanol, and butyrate plus propionate.” Fukuzaki at Abstract. Whatever this is, it is not obtaining methane from the clear phase in a high-performance methane reactor.

The Examiner has further failed to establish a *prima facie* case of obviousness because there would have been no reasonable expectation of success in combining the teaching of Bryan

with any of the cited references. For example, Weiland is a pilot-scale study run as a research investigation by the Deutsche Agrar-Alkoholversuchsanlagen GmbH. *See* Weiland at page 394, last paragraph and Acknowledgement section. The plant in Ahausen-Eversen had to be shut down in 1991, as the ecological, economical and technical specifications could not be fulfilled. *See* Final Report of Federal Research Institute for Agriculture, "Further Development and Optimizing of an Economically Friendly and Energy Saving Ethanol Production Based on Domestic Renewable Primary Products", Braunschweig (1992) "Final Report" at pages 84, 85, 112 to 121, 173 and 193-5. The Final Report points out several technical problems in addition to economic problems ("The experimental plant could not be run economically during any year." page 173, bottom). Due to the fact that the bioethanol plant described in Weiland could not be operated as expected, the plant was closed. The Weiland method clearly does not disclose advantages, such as reduced waste water and better quality of waste water. *See* Specification at page 16, paragraph 2.

In light of the above, Applicant respectfully requests withdrawal of this rejection of Claims 1-40 under 35 U.S.C. § 103 for purportedly being unpatentable over Bryan in view of Marnichenko, Francesco, Edmond, Wayman, Weiland or Fukuzaki.

IV. Claim Rejections – 35 U.S.C. § 112, 2nd Paragraph, Indefiniteness


Claims 16-21 stand rejected under 35 U.S.C. § 112, second paragraph as allegedly "being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered

indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired.” Office Action at page 3. Applicants have amended claim 16 to facilitate prosecution. As such, Applicants respectfully request withdrawal of this rejection.

CONCLUSION

In view of the above, each of the presently pending claims is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the rejections of the claims, and to pass this application to issue. The Examiner is encouraged to contact the undersigned at (202) 942-5186 should any additional information be necessary for allowance.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Kristan L. Lansbery", with a long horizontal flourish extending to the right.

David R. Marsh (Reg. No. 41,408)
Kristan L. Lansbery (Reg. No. 53,183)

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ARNOLD & PORTER LLP
555 12th Street, N.W.
Washington, D.C. 20004
(202) 942-5000 telephone
(202) 942-5999 facsimile